

SE MRC College Algebra Content Review

Dividing Polynomials; Remainder and Factor Theorems

Section 3.3

Learning Objectives:

1. Use long division to divide polynomials.
2. Use synthetic division to divide polynomials.
3. Evaluate a polynomial using the Remainder Theorem.
4. Use the Factor Theorem to solve a polynomial equation.

3. Divide using long division. State the quotient, $q(x)$, and the remainder, $r(x)$. (Simplify your answers. Do not factor.)

$$(30x^2 - x - 16) \div (6x - 5)$$

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1. Divide. (Simplify your answers. Do not factor)

$$(x^3 + 6x^2 + 7x + 2) \div (x + 1)$$

2. Divide using long division. State the quotient, $q(x)$, and the remainder, $r(x)$. (Simplify your answers. Do not factor. Use integers or fractions for any numbers in the expressions.)

$$(6x^3 + 4x^2 + 5x - 28) \div (3x - 4)$$

4. In the following problem, divide using long division. State the quotient, $q(x)$, and the remainder, $r(x)$. (Simplify your answers. Do not factor. Use integers or fractions for any numbers in the expressions.)

$$\frac{3x^4 - 4x^2 + 4x}{x - 3}$$

5. Divide using synthetic division. (Simplify your answers. Do not factor. Use integers or fractions for any numbers in the expressions.)

$$(4x^2 - 3x + 8) \div (x - 7)$$

7. Divide using synthetic division. (Simplify your answers. Do not factor.)

$$\frac{x^5 + x^3 - 2}{x - 1}$$

6. Divide using synthetic division. (Simplify your answers. Do not factor.)

$$(3x^2 + 5x - 27) \div (x + 5)$$

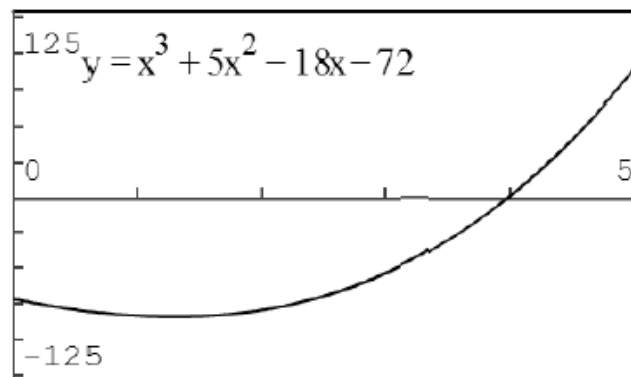
8. Use synthetic division and the remainder theorem to find the indicated function value.

$$f(x) = 4x^3 - 3x^2 - 7x + 6; f(-3)$$

9. Use synthetic division and the remainder theorem to find the indicated function value.

$$f(x) = x^4 + 3x^3 + 9x^2 - 4x - 2; f(3)$$

11. Use the graph to determine a solution of the equation. Use synthetic division to verify that this number is a solution of the equation. Then solve the polynomial equation.



$[0, 5, 1]$ by $[-125, 125, 25]$

$$x^3 + 5x^2 - 18x - 72 = 0$$

10. Solve the equation $x^3 + 2x^2 - 5x - 6 = 0$ given that 2 is a zero of $f(x) = x^3 + 2x^2 - 5x - 6$.

- a. Which solution of the equation can be determined from the graph?

The Solution is _____.

- b. What are the other solutions of the equation?

The set of the other solutions is {_____}.

The solution is {_____}.

Answer Key:

1.		$x^2 + 5x + 2 + \frac{0}{x+1}$
2.		$2x^2 + 4x + 7 + \frac{0}{3x-4}$
3.		$5x + 4 + \frac{4}{6x-5}$
4.		$3x^3 + 9x^2 + 23x + 73 + \frac{219}{x-3}$
5.		$4x + 25 + \frac{183}{x-7}$
6.		$3x - 10 + \frac{23}{x+5}$
7.		$x^4 + x^3 + 2x^2 + 2x + 2 + \frac{0}{x-1}$
8.		-108
9.		229
10.		2, -1, -3
11.	a.	4
	b.	-3, -6